v006_016

CEDV calculations

Usage related parameters

Required reserve capacity, mAh Q_reserve := 0

Cell-to-cell var of capacity under max. load,%:

Qvar := 0

Number of serial cells SN := 3 SP := 2

Vcell := 3 EDV Vmin := Vcell · SN Vmin = 9

Implementation related parameters

Set data columns: Temperature orT := 11 V orV := 12 Current orI := 13 time ort := 2

K0 := 273

ΔT := K0

vdiv := 1000

idiv := 1000

Underestimation of capacity,% SOCunder := 0

SOC Interval to fit SOClim := 9

Last data (soc below which data uncertain, %) SOCmin := 3

Loading and preprocessing data files

Loading data files, extracting end of pulse information. Data in format t(sec), V(volt), I(amper), T(kelvin) is expected.

Reading the stadard OCV file

OCV := READPRN("OCV.dat")

If reserve capacity needed T0 := 25 + K0 T0 = 298

A03 := READPRN("PN30C200") Low rate discharge to get Qmax_tot

Qmax_tot := 2400 · 2 Qmax_tot = 4800

Data at normal temperature

A01 := READPRN("PN30C20")

A02 := READPRN("PN30C0")

Vcheck := 9.773936

A01 :=

C:\..\25degree_20W.dat

A02 :=

C:\..\25degree_50W.dat

Double-Click on the arrow to un-wrap the section where data is extracted

A := OUT1 B := OUT2 B2 := OUT3 Qmax_mid = 4561.9375

Reserve room temp calcs

Data at elevated temperature

T1 := K0 + 50 T1 = 323

A01 := READPRN("PN50C20")

A02 := READPRN("PN50C0")

"LGD50C_0" A01 :=

C:\..\50degree_20W.dat

clears up zero_current area

A02 :=

C:\..\50degree_50W.dat

C := OUT2 C2 := OUT3

Reserve high calcs.

Data at low temperature

T2 := K0 + 5 T2 = 278

A01 := READPRN("PN10C20")

A02 := READPRN("PN10C0")

A01 :=

C:\..\5degree_20W.dat

Vcheck := 9.02

A02 :=

C:\..\5degree_50W.dat

D := OUT2 D2 := OUT3 Qmax_mid = 4457.419722

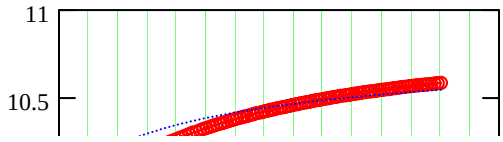
Set EDVTC and change it to achieve best fit. Value should not exceed 11 EDVTC := 9

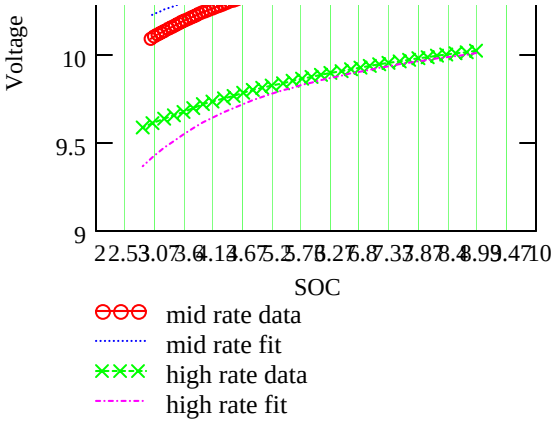
All calculations are here:

After all paramters non-linear fit

i := 0 .. rows(B) − 1 j := 0 .. rows(B2) − 1

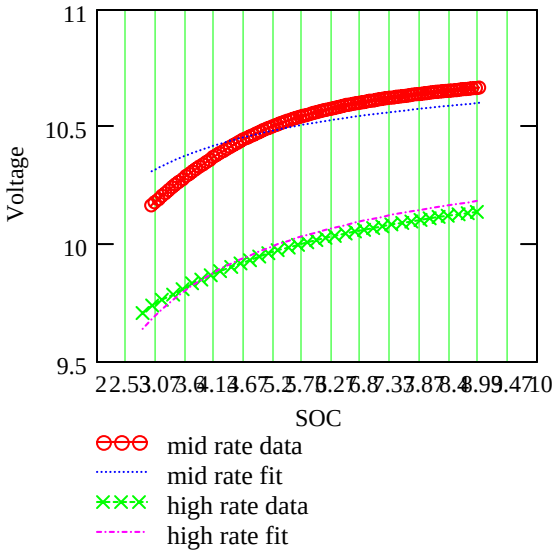
T0 − K0 = 25





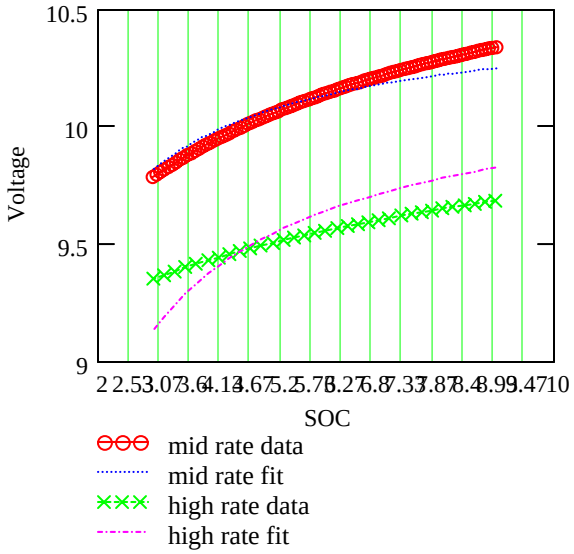
i := 0 .. rows(C) − 1 j := 0 .. rows(C2) − 1

T1 − K0 = 50



T2 − K0 = 5

i := 0 .. rows(D) − 1 j := 0 .. rows(D2) − 1



Results, overview for all data

Summary of CEDV parameters

EMF = 11152

EDVC0 = 98

EDVC1 = 0

EDVR1 = 454

EDVR0 = 2415

EDVT0 = 3970

EDVTC = 9

if EDVV set to 0, EMF and EDVR0 have to be divided by ser. cell number when written to flash

$$\frac{EMF}{SN} = 3717.333333$$

$$\frac{EDVR0}{SN} = 805$$

VOC75 = 11835

VOC50 = 11439

VOC25 = 11262

$$out := \begin{pmatrix} round\left(\frac{EMF}{SN}\right) \\ EDVC0 \\ EDVC1 \\ EDVR1 \\ round\left(\frac{EDVR0}{SN}\right) \\ EDVT0 \\ EDVTC \\ round(VOC75) \\ round(VOC50) \\ round(VOC25) \end{pmatrix}$$

out =

	0
0	3717
1	98
2	0
3	454
4	805
5	3970
6	9
7	11835
8	11439
9	11262

$$str := \begin{pmatrix} "EMF" \\ "EDVC0" \\ "EDVC1" \\ "EDVR1" \\ "EDVR0" \\ "EDVT0" \\ "EDVTC" \\ "VOC75" \\ "VOC50" \\ "VOC25" \end{pmatrix}$$

WRITEPRN("CEDV_out_lr3.dat") := augment(str, out)